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ABSTRACT

After a pilot study identified possible responses that children and adolescents give when defining concrete and abstract nouns, a study investigated the development of concrete noun (specific objects) and abstract noun (concepts) definitions given by 10, 14, and 18-year-olds, as well as whether abstract and concrete nouns are defined in a parallel fashion at a given age. Subjects, 120 randomly selected youngsters attending Chicago public schools, were interviewed and asked to define 16 concrete and abstract nouns. Results showed that concrete nouns were defined mainly by class and characteristic, while abstract nouns were defined mainly by characteristic. In contrast to concrete nouns, the total percentage of classification responses to abstract nouns increased with age--only at 18 did the subjects begin to define abstract nouns mainly by class and characteristic. Findings suggest that from the ages of 10 to 18 children and adolescents give more analytic than non-analytic responses regardless of whether these responses are correct or incorrect. Words defined analytically must be placed in a hierarchy or system of thought, their attributes determined and limits examined. Findings also suggest that the ability to define abstract nouns seems to be among the metalinguistic skills that develop later, and that adolescents are still struggling to classify these concepts and identify their characteristics. (Eight tables of data are included, and notes and references are appended.) (NKA)

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The Developeent of Concrete and Abstract Noun Definitions: A Metalinguistic Analysis

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The Development of Concrete and Abstract Noun Definitions: A Metalinguistic Analysis

Defining is a metalinguistic skill (Clark, 1978, Franklin, 1979; Watson, 1982). A metalinguistic skill may be defined as "the ability to make language forms opaque and attend to them in and for themselves" (Cazden, 1976, p. 603).

From the results of research on word definitions, we have learned that the ways in which children define words change qualitatively over time; that is, the types of definitions that children give change with growth. When preschool children define a noun, they usually do so by giving a functional response ("A chair is to sit on.") (Al-Issa, 1969; Anglin, 1977; Binet & Simon, 1916; Feifel & Lorge, 1950; Litowitz, 1977; Nelson, 1978; Piaget, 1928; Swartz & Hall, 1972; Wolman & Barker, 1965). Descriptive responses ("An apple has a stem and is round and juicy."), temporal/spatial responses ("A bed is used at night."), origin responses ("Food comes from animals."), and extensive responses ("Woofy is a dog.") also occur, but they are never the dominant definitional response at any age (Al-Issa, 1969; Anglin, 1977; Nelson, 1978; Swartz & Hall, 1972). As children mature, they begin to use nominal phrase markers like "something," or "a thing that," to substitute for a word's superordinate class name ("A chair is something to sit on.") (Burns, 1960; Litowitz, 1977; Watson, 1982). Later still, children begin to define a noun in terms of its superordinate class ("An apple is a piece of fruit."), and functional responses begin to decrease proportionately (Al-Issa, 1969; Russell & Saadeh, 1962; Swartz & Hall, 1972; Watson,

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1982). Still, functional responses as well as descriptive, temporal/spatial, and classificatory responses remain a part of a mature adult definition (Al-Issa, 1969; Anglin, 1977; Kirkpatrick, 1907; Nelson, 1978) although single extensive responses (examples) are rare (Anglin, 1977).

From the foregoing research we get a beginning understanding of the development of word definitions. However, the research on definitions has been limited.

First, while a few investigators have suggested that the growth in metalinguistic awareness may continue beyond middle childhood (Eson & Walmsley, 1980; Gardner & Lohman, 1975; Makes, 1980), most of the research on definitions focuses on the pre-school and middle age child's ability to define concrete nouns. We know nothing about the possible growth of the ability to define past this time period.

Second, what we know about the developmental stages of word definitions has been based almost wholly upon definitions given for concrete nouns. A noun can be said to be concrete to the extent that it represents a concept which has a tangible object as its referent or instance, and abstract to the extent that it has no tangible referent or instance (Flavell, 1970; Klausmeier, Ghatala, & Frayer, 1974). Abstract nouns have been used as stimuli in research on definitions much less often than concrete nouns. Moreover, when abstract words have been used as stimuli, the data from these studies have been difficult to interpret because concrete noun definitions are not analyzed separately from abstract word definitions. The conclusions drawn from the research on definitons are valid only for concrete noun definitions.

Third, ever since Binet and Simon (1916) found that children first define words by function and later by description and class, the functional, descriptive, and classificatory model has guided much of the research in the development of word definitions (Al-Issa, 1969; Gerstein, 1969; Swartz & Hall, 1972; Wolman & Barker, 1965). However, this model is inappropriate to explore the possible development of abstract noun definitions. Abstract nouns signify ideas and relationships among ideas rather than things. Abstract nouns cannot *easily* be defined by a superordinate class (Anglin, 1977), nor can abstract nouns be defined by giving a description of their perceptual properties. The functional, descriptive, and classificatory model needs to be expanded.

And finally, on intelligence tests and in those word definition studies in which abstract nouns are defined, the analyses of abstract noun definitions occurr outside of a developmental framework. Different words are given to children of different ages. Children younger than twelve define concrete nouns, while children older than twelve define abstract nouns (Binet & Simon, 1916; Feifel & Lorge, 1950; Terman, 1916; Terman & Merrill, 1937; Wechsler, 1944). Furthermore, it is assumed that when children are old enough to define abstract nouns, they do so by giving mature definitional responses (Binet & Simon, 1916; Feifel & Lorge, 1950; Kruglov, 1953; Russell & Saadeh, 1962). There is no basis for the assumption that children first define abstract nouns by giving mature dictionary definitions or for the assumption that children under twelve cannot define abstract nouns in some manner. If there is a development in concrete noun definitions, there is reason to

believe that there is also a development in abstract noun definitions.

The purpose of this study is to chart the development of concrete and abstract noun definitions given by 10, 14, and 18 year olds and to discover whether abstract and concrete nouns are defined in a parallel fashion at a given age. Specifically, two questions are asked: (1) What types of definitional responses do 10, 14, and 18 year olds produce in defining concrete and abstract nouns? and (2) Do patterns of responding (the combination of different types of responses) emerge?

Definitonal Responses

I conducted a pilot study to identify possible definitional responses that children and adolescents give when defining concrete and abstract nouns. The six broad definitional responses that emerged are (1) class, (2) characteristic, (3) criterion, (4) coordinate, (5) extension, and (6) negation. An additional category which respresents a noise factor is called miscellaneous. These responses are used to code the definitions in the current study. The functional, descriptive, and classificatory responses that children give when defining concrete nouns are not discarded, but, rather, are incorporated into this new and expanded list of definitional responses. The description of the responses follows.

Class

Class responses name the superordinate class to which the definiendum belongs and may be divided into two subcategories: explicit class and implicit class.

Explicit class. An explicit class refers to the genus or

superordinate to which the definiendum belongs, e.g., "A flower is a plant," or "Courage is a state of mind which enables a person to face danger."

Implicit class. Implicit class responses are responses which use words such as, "something," "stuff," or "a thing that" to stand for the superordinate name, e.g., "A chair is something to sit on" and "Courage is something that helps you to do what you have to do."

Characteristic

A characteristic response refers to the properties or attributes of the definiendum; that is, a quality belonging to or associated with a person, object, or idea. There are eight types of characteristic responses: 1) function, 2) action, 3) part, 4) composition, 5) feature, 6) time/space, 7) origin, and 8) ideation.

Function. A functional response refers to the use to which the definiendum is put, e.g., "A chair is to sit on" and "You need courage to do things that you really don't want to do."

Action. An action response refers to how the definiendum behaves, e.g., "A rabbit hops," and "Wisdom grows."

Part. A part response refers to a part of an object, e.g., "A chair has four legs." Because part responses refer to parts of a whole *object*, there can be no part responses to abstract nouns.

Composition. A compositional response refers to what the object is made of, e.g., "A chair is made out of wood." Because compositional responses refer to physical properties of *objects* there can be no compositional responses to abstract nouns.

Feature. A feature response refers to an attribute of the definiendum but is not an action, part, or composition, e.g., "An apple is _green_" and "Justice is _blind_."

Time/Space. A temporal/spatial response refers to the location of the definiendum and/or the time associated with it, e.g., "_When you are in school_, you sit on chairs," and "Freedom is _in the United States_."

Origin. An origin response refers to how the definiendum began, e.g., "Rocks are _made by compression_," and "We have freedom _from the Constitution_."

Ideation. An ideational response refers to characteristics derived from ideas or relationships between ideas, e.g., "A flower is _beautiful_." "Truth is _what really happened_." "Freedom is _having choices_," and "Freedom is _being able to do what you want to do_."

Criterion

A criterial response indicates an awareness of or an attempt to find the boundaries or the limits of the definiendum and which, thereby, permits a finer discrimination of the definiendum from other like entities or states. These responses usually follow other types of responses, e.g., "A chair is someplace to sit above the ground with four legs. Four legs and a seat for someplace to sit--_for one person to sit_. That would be a chair," and "Freedom is doing anything that you want, _but it has to be within the law_."

Coordinate

Coordinate responses state that the definiendum is identical or

similar to another coordinate word or concept. There are two types of coordinate responses: true synonyms and similars.

True synonym. A true synonymous response is a one or two word response which is equivalent in meaning to the definiendum. True synonymous responses usually follow a form of the verb, to be or to mean, and are predicate nominatives or adjectives, e.g., "A bush is a shrub," "Truth is reality" and "Courage means bravery."

Similar. Similar responses state that the definiendum is similar to another coordinate word or concept. Words, such as, "sort of like," kind of like," and "similar to" are sometimes used in these types of responses. Examples are: "A chair is similar to a sofa" and "Courage is being kind of brave, but its not the same thing as bravery."

Extension

Extensive responses refer to subordinates of the definiendum, e.g., kinds of, examples, and instances of the definiendum. Extensive responses are divided into two subcategories: specific events or situations and types.

Specific events. Specific events or situations refer to idiosyncractic, experiential, or actual experiences and are often preceded by the words, "like," or "is when," e.g., "My father's car" (car is the definiendum). Other examples are: "Courage is riding on the American Eagle (a large roller coaster)" and "Freedom is like when you are in jail and someone comes and bails you out."

Types. These responses are not descriptions of particular situations, but rather, they are enumerations of subordinate categories

of the definiendum, e.g., "There are two types of courage: physical and mental courage," and "A couch is a complicated form of a chair." This latter response is not a class response because "chair" is the word being defined.

Negation

There are two kinds of negative responses: true negations and antonyms.

True negations. A true negative response is a response in which the main verb is negated and which, therefore, expresses what the definiendum is not rather than what it is, e.g., "A chair is not a bench," and "Freedom is not being bound by anything or anybody." True negative responses negate class, characteristic, criterion, synonym, and extensive responses. If the main negated verb negates a word which is opposite in meaning to the definiendum, the response is coded as an antonym rather than as a true negation.

Antonyms. An antonymous response is opposite in meaning or states that another word is opposite in meaning to the definiendum. Examples are: "The opposite of a flower is a weed," "The opposite of truth is false" and "Truth is not lying."

Miscellaneous

Miscellaneous responses do not give any information about the meaning of the definiendum and, therefore, are technically not definitional responses. There are several types of miscellaneous responses.

Structural statements. Structural statements serve as a bridge to another thought or which indicate closure of a thought process, e.g.,

"Courage is being strong enough to do something that you are afraid of. That's what courage is."

Simple repetitions. Simple repetitions are responses in which the definiendum or a derivative of it is repeated, e.g., "Freedom is free."

Undecipherable comments. Comments which are meaningless or which cannot be understood are called undecipherable comments, e.g., "I would say, ah, ah, well, ...".

Task comments. Remarks about the definitional task are task comments, e.g., "Truth is a hard word to define."

Off-target comments and errors. Comments which do not give any information about the meaning of the definiendum are off-target comments and errors, e.g., "Justice is freedom" and "Sin is everybody's profession."

Restatements. Responses which are repeated are restatements, e.g., "Truth is not lying. Truth is telling what really happened, what really occurred. Not lying. That's all I can think of."

Analytic and Non-Analytic Responses

Even though defining is a metalinguistic skill, some of the above definitional responses reflect analytic skills while others do not. I suggest that defining with the responses of class, characteristic and criterion involves a process of analysis, while defining with the responses of coordinate and extension does not.

To define words analytically, the subject places the word in a hierarchy or a system of thought ("Freedom is a condition"), determines its attributes ("Freedom is having choices in everything you do"), and

examines its limits ("Freedom is doing anything you want as long as it is lawful."). Analyzing requires the subject to determine the nature of the whole; to separate into parts; to examine methodically. In other words, the subject gives class, characteristic or criterion responses which tell us a great deal about the meaning of the word being defined. Defining by coordinate and extensive responses does not involve the process of analysis. In giving coordinate and extension responses, the subject does not determine the nature of the whole, or examine methodically, or separate the whole into parts. When defining by these responses it is as if the word is being used only to prod one's memory of a like term or of an event associated with it. Take, for instance, the definitions, "Truth means veracity" and "Freedom is going to a party on Saturday night." No analysis is required to give the synonym, "veracity", or the extension, "going to a party on Saturday night".

What about negation responses? Are they analytic or non-analytic? They are both.

When negation responses negate classificatory ("A bush is not a tree"), characteristic ("Freedom is not being bound by anything or anyone"), and criterion ("Freedom is doing what you want. Well, not everything; but only those things which are within the law.") they are negating analytic responses. When negation responses negate coordinate ("Freedom is not the same as liberty") and extensive responses ("Freedom is not having to practice the piano"), they are negating non-analytic responses. Antonyms, a type of negation response, are non-analytic responses for the same reasons that synonyms are. Antonyms merely state

the opposite meaning of the definiendum, while synonyms state an equivalent meaning. Negations are the only definitional response which can be analytic or non-analytic. In brief, we can subsume all six definitional responses under the two categories of analytic and non-analytic (see table 1).

Insert Table 1 about here

Method

Participants

I asked twenty males and twenty females each at the ages of 10, 14, and 18 (120 participants in all) to define eight concrete and eight abstract nouns. The participants attended Chicago public schools. I selected participants at the ages of 10 and 14 from only those who scored at the 40th percentile through the 88th percentile on the vocabulary and reading sections of the Iowa Tests of Basic Skills (ITBS). Because the ITBS is not designed for children over the age of 14, I selected 18 year olds from those scoring at the 40th percentile through the 88th percentile on the written expression and reading sections of the Tests of Achievement and Proficiency (TAP). Both the ITBS and the TAP correlate highly with the Lorge-Thorndike Intelligence Test (L-T) (Technical Manual, Lorge-Thorndike Intelligence Tests, 1966). The average score on the ITBS for 10 year olds was 69.8% and for 14 years olds, 66.5%. The average score on the TAP for 18 year olds was 69.5%. I randomly selected subjects from those whose parents gave permission for them to participate in the study.

Interview

I interviewed each participant separately and asked him or her to define 16 nouns which I gave in random order. Following the procedures of previous definitional research, I said to each participant, "Give me a definition for X." If the participant did not respond, I asked, "If you had to explain to a friend what the word X means so that your friend would understand, what would you say?" I continued this procedure until the participant had been asked to define all 16 nouns. At the end of the session, I once again asked the participant to define those words which he or she by-passed. I taped all answers.

Words

I asked each particpant to define eight concrete and eight abstract nouns. I selected the nouns so that they would be familiar to the youngest participants.

The concrete nouns defined were book, bush, car, chair, flower, rabbit, rock and shirt. They represent the categories of animal, plant, mineral and object. The abstract nouns defined were beauty, courage, freedom, happiness, justice, sin, truth, and wisdom. I selected these nouns from among the great ideas listed in the *Great Books of the Western World* (Adler, 1952). All of the concrete and abstract nouns fall within the first 2,000 most frequently used words as reported by Thorndike (1932) in his study of reading material which included children's literature and elementary textbooks.

Coding the Definitions

I coded each definition to identify what type or types of responses

were present in it. The following illustrates the coding.[8]

Interviewer: Give me a definition of chair.

Subject: Thing/to sit on/with four legs/and a back/and a seat./ (Class-implicit, Characteristic-function, Characteristic-part, Characteristic-part, Characteristic-part)

Interviewer: Give me a definition of freedom.

Subject: Getting to do what you want/and not having to . . . / like you wouldn't have to do everything that someone told you,/just some things if they are important./ (Characteristic-ideational, Miscellaneous-undecipherable comment, Negation-true, Criterion)

Counting Definitional Responses

Percent of definitional responses. Every time a subject gave one of the subcategory responses in a definition I counted it as 1. (I excluded the six miscellaneous responses in this calculation and in all other calculations for they constitute a noise factor). From this count, I calculated the percentage of each of these responses out of the total number of definitional responses for all concrete nouns by age and for all abstract nouns by age. These percentages are simply reported as descriptive statistics.

Second, I calculated the percentage of each of the six broad definitional responses of class, characteristic, criterion, coordinate, extension and negation out of the total number of definitional responses by sex and age separately for both concrete and abstract nouns. The percentages of each of the definitional responses are the dependent

measures in a 3 X 2 X 2 factorial design with nested classifications.

Third, I calculated the percentages of analytic and non-analytic responses by type of noun and age.

Patterns of responding. A pattern of responding is defined as any definitional response which appears with another response or other responses in 5% or more definitions for either concrete or abstract nouns for any age group. For example, if 10 year olds gave a total of 237 definitions and negation + characteristic appeared together in at least 5% or 11 of these definitions, I considered negation + characteristic to be a response pattern. I calculated the percent of definitions containing each response pattern by type of word and age group.

Inter-rater Reliability

Two coders coded the same randomly selected 200 definitions: 20 concrete definitions and 20 abstract definitions at the 10 year old level, 30 concrete definitions and 30 abstract definitions at the 14 year old level, and 50 concrete definitions and 50 abstract definitions at the 18 year old level. Because I expected older subjects to give more types of definitional responses than younger subjects, reliability is increased if a higher number of definitions came from older participants.

The inter-rater reliability index is .84 for the abstract nouns and .85 for the concrete nouns. I included miscellaneous responses in the calculation.

Results

Definitional Responses

Definitional responses to concrete nouns. Concrete nouns are

defined mainly by class and characteristics (see table 2). Class responses comprise 22.1% of the total number of all definitional responses, and characteristic, 70.6%. Criterion, coordinate, extension, and negation responses are given infrequently, that is, only .3%, 3.1%, 1.5% and 2.4%, respectively.

Insert table 2 about here

While class and characteristic are the predominant responses for concrete nouns, class responses decline from 24.7% at age 10 to 20% at age 18. At first glance, this decline seems to contradict the results of earlier research which clearly show that class responses increase with age (Al-Issa, 1969; Russell & Saadeh, 1962; Swartz & Hall, 1972). However, an explanation arises. Class responses are divided into two types: explicit (A chair is a piece of furniture) and implicit (A chair is something you sit on). As shown in table 3, concrete explicit class responses increase 7.3% while concrete implicit responses decrease 12% from age 10 to 18. Explicit class responses in this study are equivalent to class responses in the earlier research. Even though the total percentage of concrete class responses decreases with age, explicit class responses increase with age.

Insert table 3 about here

Definitional responses to abstract nouns. Abstract nouns are defined mainly by giving characteristic responses (see table 2). Characterisitc responses remain preponderant at 48.2%. Negations become the

second most frequently given response at 16.3%, while class responses drop to third place at 12.8%. Coordinate, extension and criterion responses are 11%, 7.3% and 4.4%, respectively.

In constrast to concrete nouns, the total percentage of class responses to abstract nouns increases with age. This overall increase is due to a 7.9% increase in explicit class responses and a .2% decrease in implicit class responses from ages 10 to 18 (see table 4). Even though the total percentage of class responses increases for abstract nouns and decreases for concrete nouns, explicit class responses increase and implicit class responses decrease with age for both types of nouns.

Insert table 4 about here

By far the most interesting finding is that participants often define an abstract noun by saying what it does not mean rather than by saying what it does mean. Negations are the second most frequent response at ages 10 and 14. Class becomes the second most frequent response at age 18 as negation becomes the third most frequent response.

Concrete and abstract noun responses compared. The most frequently given response to both concrete and abstract nouns at all age levels is characteristic and the most infrequently given response is criterion, except for 18 year olds who give fewer extensive than criterial responses to abstract nouns (see table 2). With the exception of characteristic and criterion, the rank order of responses for concrete and abstract nouns differs. The second most frequent response to concrete nouns is class, with coordinate, negation, extension, and criterion following in

that order. In constrast, the second most frequent response to abstract nouns is negation, with class, coordinate, extension, and criterion following in that order. Obviously, if negations were taken away, the rank order of responses between concrete and abstract nouns would be the saee. Negation responses are clearly the anomaly.

In addition to the rank order differences, participants give considerably lower proportions of class and characteristic responses and considerably higher proportions of criterion, coordinate, extention and negation responses to abstract nouns than they do to concrete nouns. Class and characteristic responses to concrete nouns coeprise 92.7% of the total number of definitional responses and to abstract nouns, 61%. On the other hand, only 7.3% of the responses to concrete nouns are criterion, coordinate, extension and negation as opposed to 39% for abstract nouns.

Further, the trends of increase and decrease in the percentage of responses with age are different for concrete and abstract nouns. Class responses to concrete nouns decrease with each age and characteristic responses increase with each age. However, there are no consistent increases or decreases in criterion, coordinate, extension and negation responses to concrete nouns. On the other hand, there are consistent increases or decreases in five of the responses to abstract nouns. The percentage of class, characteristic, and criterion responses to abstract nouns increases at each age while the percentage of coordinate and negation responses decreases at each age. Only extension responses to abstract nouns show a slight inconsistency. The differences in the rank

order of responses, the large differences in the percentages of these responses, and the lack of symmetry in the trends of increase or decrease of definitional response indicate that there are clear differences in the way concrete and abstract nouns are defined.

What these results tell us is that the development of concrete noun definitions from age 14 to 18 is one of quantity and not of quality. Participants continue to give more explicit class and characteristic responses with age instead of giving other types of responses. Since the percentages of criterion, coordinate, extension, and negation responses are small and none of these percentages show consistent movement toward increase, we can assume that these responses are peripheral to defining concrete nouns and will remain so. The rank order of all six responses does not change from ages 10 to 18. Only the percentages of these responses change. Development of concrete noun definitions, then, is predominantly a matter of growth in the number of explicit class responses from age 10 to young adulthood. Secondarily, development is growth in the number of characteristic responses.

In constrast, it looks as if abstract noun definitions develop qualitatively from the ages of 10 to 18; that is, the rank order of responses changes. At ages 10 and 14, the most frequently given response is characteristic, the second most frequently given response is negation, the third is coordinate, and the most infrequent response is criterion. Extension and class responses are the fourth and fifth response, respectively, for 10 year olds; whereas, the reverse is true for 14 year olds. At 18 years of age, characteristic responses remain the most frequently

given. However, negation and coordinate responses move from second and third place to third and fourth place, respectively, while class responses become the second most frequently given response. Even though negations drop from second to third place at 18 years of age, they still remain a frequent response to abstract nouns.

To summarize, it is not until participants are 18 years old that they begin to define abstract nouns as they define concrete nouns at age 10 through 18; that is, mainly by class and characteristic. Even though there is no clear research on how adults define abstract nouns, we can argue that lexicon definitions are mature adult definitions and that these definitions are composed primarily of class and characteristic responses. If we can agree that this is the case, then we would expect children's abstract noun definitions to become more like lexicon definitions with age. Since both concrete and abstract noun definitions are defined maturely by class and characteristic, it is not surprising to find that the development of concrete and abstract noun definitions follow a similar trend of an increase in explicit class and characteristic responses. Nevertheless, class responses to abstract nouns do not become the second most frequent response until age 18. Because participants older than 18 were not studied, we cannot be sure that the trend to define abstract nouns by class and characteristic responses will continue. It could be that with age, criterion, coordinate, extension, and negation responses to abstract nouns will fall to the levels that are found for concrete nouns and that class and characteristics responses to abstract nouns will rise. However, it could also be that abstract nouns

will continue to be defined by giving higher proportions of criterion, coordinate, extension and negation responses than are given for concrete nouns and lower proportions of class and characteristic responses. The assumption is that class and characteristic responses will continue to increase (or at least stabilize) with age. Since there are consistent increases in the percentages of class and characteristic responses and consistent decreases in the percentages of coordinate, extension, and negation responses to abstract nouns from 10 to 18 years of age, we do have some support for the assumption that class and characteristic responses will remain the two most frequently given responses, and in this sense, abstract noun definitional development will continue to duplicate concrete noun definitional development. And the first evidence we have of this similarity in development is at age 18. As a result, it appears that abstract noun definitional development lags behind concrete noun definitional development.

Multivariate analysis of variance (MANOVA) with repeated measures reveals significant main effects of age ($F = 3.097$, d.f. 2, 114, $P < .001$), definitional type ($F = 1091.917$, d.f. 5, 110, $P < .001$), and type of noun (concrete and abstract) ($F = 159.092$, d.f. 1, 114, $P < .001$). There are also significant two-way interactions between type of definitional and age ($F = 4.199$, d.f. 10, 220, $P < .001$), and type of noun (concrete and abstract) and type of definitional response ($F = 119.761$, d.f. 5, 110, $P < .001$). And finally there is a significant three-way interaction between type of noun (concrete and abstract), type of definitional response, and age ($F = 6.015$, d.f. 10, 220, $P < .001$).

There are no significant main sex effects or sex interactions.

Analytic and non-analytic responses. I have suggested earlier that defining by class, characteristic, and criterion responses involves a process of analysis, while defining by coordinate and extension does not. Negation responses can be either analytic or non-analytic depending upon what type of response they negate. When I combine these responses under the categories of either analytic or non-analytic, we can see that analytic responses increase and non-analytic responses decrease only for abstract nouns (see table 5). From ages 10 to 18 analytic responses increase from 66.1% to 85.6% and non-analytic responses decrease from 34.0% to 14.4%. For concrete nouns, the per cent of both analytic and non-analytic responses remains virtually the same at all age levels at around 95% and 5%, respectively. As we saw with the percentage of definitional responses, concrete noun definitions have a stability that abstract noun definitions do not have.

Insert table 5 about here

Patterns of Responding

There are only three patterns of responding for concrete nouns (see table 6). By far the most frequent pattern at all ages is class + characteristic. Seventy-four percent, 67%, and 65% of the definitions contain the class + characteristic pattern at ages 10, 14, and 18 respectively. At every age, the second most frequent pattern is characteristic and the third at ages 10 and 18 is class + characteristic + negation. Overall, 99% of the total number of definitions given to concrete nouns

contain these three patterns.

Insert table 6 about here

Subjects use more patterns in defining abstract nouns than they do in defining concrete nouns. Seven patterns comprise 75% of the total number of abstract noun definitions. Of these seven, only three patterns are the same as those given to concrete nouns. These patterns are 1) class + characteristic, 2) characteristic, and 3) class + characteristic + negation.

For abstract nouns, the class + characteristic pattern rises from 8% at 10 years of age to 12% at 14, and to 23% at 18 years when it becomes the most frequently given. The percentages of the characteristic pattern remain fairly stable from ages 10 to 18. The percentages are 20, 22 and 19, respectively. At 18 years it becomes the second most frequently given pattern. These two patterns, the class + characteristic and the characteristic, comprise only 35.7% of the total number of definitions given to abstract nouns, whereas for concrete nouns they comprise 78.3%. By 10 years of age, the rank order of these two patterns is stable for concrete nouns, while the same rank order of these responses is not apparent for abstract nouns until age 18. The class + characteristic + negation pattern appears for the first time in abstract noun definitions at age 18 where it is the fourth most frequently given response at 8%.

Negations

Since negation responses play such a large part in the defining of abstract nouns and are clearly the anomaly in the rank order of responses

between concrete and abstract nouns, we need to examine these responses in more detail.

I have previously suggested that when negation responses negate class, characteristic and criterion responses, they negate analytic responses. When negation responses negate coordinate and extensive responses they negate non-analytic responses. Antonyms, which negate no response, are simply non-analytic responses.

As we can see from table 7, negated analytic responses increase with age while negated non-analytic responses decrease with age[a]. (One salient feature of table 7 is that no antonyms are given for concrete nouns. This phenomenon is not surprising since very few concrete nouns have antonyms.) Negated analytic responses increase 3.3% and 15.4% from ages 10 to 18 for concrete and abstract nouns, respectively. Negated non-analytic responses decrease 3.3% and 5.2% from ages 10 to 18 for concrete and abstract nouns, respectively. It is also apparent that the percentages of negation responses are less variable for concrete nouns than they are for abstract nouns. These trends are similar to the ones we found between analytic and non-analytic responses to concrete and abstract nouns (see table 5).

Even though negations are given more often to abstract nouns than to concrete nouns (see table 2), we first need to discuss why negations are given at all. The responses of class, characteristic, criterion, coordinate, and extension are all responses which assert. Negation responses do not assert; and yet they are given. If we believe that there is development in the way a person defines nouns and that definitional

responses gradually approximate those found in a dictionary, why do subjects give negation responses while lexicographers typically do not? The answer is twofold.

First, the giving of negations may just be a matter of wording (Copi, 1972). For example, happiness was defined by a 14 year old as "having no worries." It could have just as easily been defined as being "free of worries."

Second, we are witnessing the thinking processes of our subjects as they are involved in the task of defining; whereas, when we consult a dictionary, we see only the end product of a lexicographer's work. The following definitions clearly illustrate some of the thinking processes in which subjects engage when they are asked to define.

Eighteen year old. Defining justice.

> "It's a... I think it has to do with the laws in... A good law is a just law and justice is... Gosh, I can't... Got myself in a corner. I know what it is but I can't explain it. It's hard for me to explain. Usually I don't have trouble. Justice. It's on the tip of my tongue. It's a feeling of rightness. That you are done right by. I don't know how to say it. Justice is a feeling that... Is it a feeling? No, its not a feeling. I really don't know. I can't explain."

Eighteen year old. Defining bush.

> "A bush is... Well, it has branches like a tree, but it's not really a tree. It's like a... I guess you could call it a big plant that grows outside. It grows outside and it's usually

oval-shaped. Not round or... It doesn't grow up. It grows out. It has branches, but it's not necessarily a tree."

These definitions do not have a finished quality to them. We are observing the processes in which these subjects are engaged as they struggle to define. It is this activity of delineation by negation that is captured in this study.

According to Copi (1972), negations are permissible under two conditions: when the definiendum is essentially negative in meaning ("Bald means having no hair") or when the definiendum is itself an extension of a class which has so few extensions that it is easier to define the definiendum by negating the other extensions ("A scalene triangle is a triangle which is neither equilateral nor isoceles"). Yet none of these negations is permissible unless it is coupled with an affirmative response (Copi, 1972).

When we look at table 6, negations are always given with other types of responses except by 10 year olds to abstract nouns. Thirteen per cent or thirty-one of the definitions given by 10 year olds to abstract nouns contain single negations. No single negation was ever given to concrete nouns at any level. And even though de Villiers and de Villiers (1972) argue that very young children will not negate without first asserting, the 10 year olds in this study, when asked to define abstract nouns, did often negate before asserting. Older subjects more often couple their negations with other types of responses. They must somehow know that defining by single negations is not acceptable.

Because negations play a larger part in defining abstract nouns than

they do in defining concrete nouns, we must ask why this is so. Vygotsky (1934/1962) gives us a clue.

> Our own experimental studies suggest that the child becomes aware of differences earlier than of likenesses, not because differences lead to malfunctioning, but because awareness of similarity requires a more advanced structure of generalization and conceptualization than awareness of dissimilarity (p.88).

Since the total mean percent of class and characteristic responses for abstract nouns is only 61 as opposed to 92.7 for concrete nouns (see table 2), it appears that children and adolescents do not yet possess a high level of conceptualization or advanced structure of generalization for abstract nouns as they do for concrete nouns. Since a high level of conceptualization or an advanced structure of generalization implies the ability to see similar characteristics among the subordinates of a term, subjects give responses to abstract nouns which do not reflect this ability; i.e., they give coordinate, extension or negation responses. These latter responses reflect awareness of differences which, according to Vygotsky, develops earlier than the awareness of similarities. Saying what a noun is not, analytically, indicates awareness of differences and a less advanced level of generalization and conceptualization than saying what a noun is, analytically. Saying what a noun is not, non-analytically, indicates awareness of differences and a non-awareness of similarities. The difference between defining by analytic negations and non-analytic negations is a matter of the degree to which likenesses are identified. If we can assume that concrete nouns reflect better estab-

lished concepts than abstract nouns do, it should not be surprising that the ability to express those established meanings should come before the ability to express the meaning of less established concepts.

Discussion

I have suggested that the development of abstract noun definitions follows the development of concrete noun definitions. But what makes the task of defining abstract nouns so difficult? The research conducted on children's early vocabulary may help us to answer this question. When children first learn to speak, they learn nouns before they learn verbs (Gentner, 1982; Huttenlocher, 1974; Nelson, 1978). They not only produce more nouns than verbs, but they comprehend more nouns than verbs (Goldin-Meadow, Seligman & Gelman, 1976). A suggested reason why nouns are learned before verbs is what Gentner (1982) calls conceptual cohesiveness.

> The Gestalt psychologists propose that certain relations--such as proximity, common fate, boundedness--between perceptual elements lead people to see them as an integral object. . . .
>
> If objecthood is created by spatial relations among perceptual elements, then good concrete objects are particularly cohesive collections of percepts. This line of thinking leads to the speculation that the perceptual elements that are packaged into noun referents are highly cohesive (i.e., have many internal relations to one another), while the perceptual elements that are packaged into verb referents are distributed more sparsely through the perceptual field and have fewer internal relations with one another.

> From the point of view of language invention, this suggests that there are in the experiential flow certain highly cohesive collections of percepts that are universally conceptualized as objects, and that these tend to be lexicalized as nouns across languages. Children learning language have already isolated these cohesive packages. . . from their surroundings. Because the language they are learning will have selected the same set of concrete objects as its nominal referents, children need only match preconceived objects with cooccurring words. (p. 324)

In learning language, children utilize preexisting cognitive tendencies that allow some perceptual information to be separated easily from the general stream of percepts. There are fewer perceptual constraints for verb meaning than there are for noun meaning. Since children must learn or discover what relations are included in the meaning of a verb, the acquistion of verbs is slower than it is for nouns. Children do not have the same difficulty with concrete noun conflation since concrete nouns refer to stimuli which have distinct boundaries, stable relations among its components, and remain available for inspection (Clark, 1983).

While the above argument is made to explain the difference in the learning of nouns and verbs (and predicate words), I extend this argument to include abstract nouns. Since abstract nouns, like verbs, do not refer to tangible objects, there are fewer perceptual constraints and, therefore, more variability on what to conflate. I can speculate, then, that concrete nouns are learned prior to abstract nouns. And indeed, when we look at lists of children's early words, abstract nouns are

absent (see Gentner, 1982, for a summary of early word acquisition). This discrepancy suggests that children have better established concepts for concrete nouns than they do for abstract nouns. It is not surprising then that the difference in the percentages of analytic responses should reflect this phenomenon. But are the data solely a reflection of the growth in knowledge of the conventional meaning of a noun?

I argue that the ability to define concrete and abstract nouns by analytic responses is obviously dependent upon the child's or adolescent's knowledge of the conventional meaning of the definiendum, but it is also dependent on the young person's implicit or explicit knowledge of the definitional form.

While some of the difference (decalage) between concrete and abstract noun definitions can be attributed to lack of knowledge (one cannot define what one doesn't know), all of the difference cannot be attributed to a lack of knowledge. First, lack of knowledge cannot explain why participants, when they defined abstract nouns, did not often substitute implicit class responses for explicit class responses as they did for concrete nouns. Stated in another way, the differences in the percentages of implicit class responses to concrete and abstract nouns cannot be explained by lack of superordinate knowledge because defining by implicit class does not require superordinate knowledge. We could say that the reason why "something" wasn't used frequently as a nominal place marker for abstract nouns was that the word, something, refers to "a thing" and "a thing" is concrete. But this explanation is not altogether satisfactory. In everyday conversation, we use the word, something, to

refer to abstract feelings and ideas also. When we say "Something is bothering me," we can mean that some vague thought or experience is disturbing. In this case, "something" is used to refer to an unknown abstract quality.

Second, if giving correct analytic responses is solely the reflection of lexical knowledge (which is expressed by class and characteristic responses), then any errors which occur should contain no larger percentage of analytic responses than non-analytic responses. To determine if this were so, I went back into the data and inspected the errors the participants made. Errors are a subcategory of miscellaneous response (see table 1). In examining these errors, I found far more analytic than non-analytic responses (see table 8). In addition, the percentages of analytic and non-analytic errors to concrete nouns vary much less than the percentages to abstract nouns. This stability and variability was also seen for correct analytic and non-analytic responses to concrete and abstract nouns (see table 5).

Insert table 8 about here

The "error" data must be used with caution though. The number of errors is small, and these responses, because they are errors, are sometimes hard to classify. Notwithstanding these difficulties, the differences in the percentages between the analytic and non-analytic errors is on the whole fairly large and may point to real differences between the two. Tentatively speaking then, from the ages of 10 to 18, children and adolescents give more analytic than non-analytic responses regardless of

whether these responses are correct or incorrect. It is as if young people know the form that a definition should take and are using that knowledge even when they give erroneous answers. Knowledge of the conventional meaning of a noun is necessary but not sufficient for the giving of correct analytic responses.

Taking the discussion further, it may be that 10 year olds are not conscious of the form of their definitions regardless of what type of noun they are defining. Ten year olds never expressed their doubts about the proper way to define a word. They only expressed their doubts about the correct meaning of a word. As Tunaer and Herriaan (1984) remark

> It is entirely possible, for example, that children are able to perform aetalinguistic operations without being able to provide *explicit, adult-like* judgeaents about language structure and function. . . .(p.14) (italics added)

On the other hand, the 14 and 18 year olds seeaed aware of the fora that the definition should take, but they expressed this awareness alaost entirely when they defined abstract nouns. They seeaed conscious that giving synonyas, extensions, negations, and repetitions (repeating the definiendua) are not acceptable ways to define a word. The following reaarks these subjects gave are examples of this consciousness.

Fourteen year old. Defining beauty:

> "I can't think of anything for beauty. Appealing appearance. Can *I use examples*? Beauty would be like a flower or aaybe a newborn baby or soaething."

Fourteen year old. Defining car:

Can I use antonyms or, wait, synonyms? An automobile. A large vehicle."

Fourteen year old. Defining freedom:

"When you are free to do what you want to do, I guess. *I know it's not good to define the root word with the same word.*"

Eighteen year old. Defining freedom:

"Freedom is, *I know this is wrong*, but freedom is being free."

Eighteen year old. Defining truth.

"Truth is a.... Gosh. Its a hard one for me. Well, I could say its the opposite of lying, *but that's not a good definition.* Its being honest and not hiding the facts. I *think* that's my definition."

According to Van Kleeck (1982), young children cannot focus on both the meaning of language and the form of language at the same time until they are concrete operational thinkers--approximately 5 to 7 years old. Preoperational children usually focus on content; for example, judging whether a sentence is grammatical based on its truth value. Concrete operational children can focus on both content and form. These children can decide whether two statements, different in their structures, are alike in their meanings.

Similarly, Hakes (1980) believes the change in metalinguistic awareness from the preoperational to concrete operational level is not exchanging a non-metalinguistic approach for a metalinguistic one, but rather gaining additional metalinguistic approaches. For instance, when given a task to determine if a sentence is grammatical, the child can

increasingly and deliberately decenter from the content of the sentence and focus on the structure or form of the sentence. The child does not abandon the metalinguistic ability of focusing on the content. The child uses this ability but adds the strategy of focusing on form. As the child matures, s/he adds more strategies to his or her repertoire and is able to solve more types of linguistic problems.

Information from the protocols in this study leads one to believe that the ability to focus on both form and content occurs after the age of ten for the metalinguistic task of defining. For both concrete and abstract nouns, ten year olds appear to focus only on the content. Fourteen and eighteen year olds appear to focus only on content when they define concrete nouns. When 14 and 18 year olds define abstract nouns they focus on both content and form. It may be that as long as one can accomplish a task easily, there is no need to examine the way in which the information is conveyed. But when the task is not so easy to accomplish, the way to express that meaning becomes more conscious but only if one has reached a certain level of maturity. Since Van Kleeck (1982) argues that the ability to focus on both form and content emerges during early concrete operations and the results from this study indicate that this ability appears after the age of ten when adolescents are defining abstract nouns, what we may be seeing is not only a decalage within the metalinguistic task of defining itself, but a decalage between the task of defining and other metalinguistic tasks. The ability to define abstract nouns seems to be among the late developing metalinguistic skills just as understanding humor, metaphor, and literary styles are

(Eson & Walesley, 1980; Gardner & Lohman, 1975).

What are the implicatons of this knowledge for education? The nouns used in this study may be what Vygotsky (1934/1962) calls spontaneous concepts. Spontaneous concepts are concepts that the child learns informally rather than formally in school. At first, the child does not place the concepts in a taxonomical system. According to Vygotsky, children learn to place their spontaneous concepts within a system as they are exposed to scientific concepts in school. Scientific concepts are those concepts which are first introduced in school as part of a larger system. From this understanding of a generalized order, children begin to place their spontaneous concepts within a taxonomy. Thus, the categorization of spontaneous concepts is a result of the influence of formal teaching.

The concrete nouns used in this study are all common nouns that children are likely to know before they enter school. Children probably learn the abstract nouns after they enter school. Yet both types of nouns may be spontaneous concepts. With the exception of "freedom" and "justice", neither the meanings of the concrete nouns nor the abstract nouns are likely to be formally taught in school. Therefore, children must accomplish the systematizing or the classifying of these concepts by their own efforts. Children classify the concrete nouns in this study by the time they are ten years old. Indeed, classifying is a process so ordinary that children seem to rarely think about it consciously when they are asked to define these common nouns. Even the process of characterizing seems to be accomplished without much consciousness on the

child's part. This automaticity is the reason Vygotsky gave for not studying concept formation through the child's definition. He thought definitions reflected completed thought. This study suggests otherwise for abstract nouns. Children and adolescents are still struggling to place these concepts within a classification and to identify their characteristics. This would imply that adolescents are not nearly as knowledgeable about important abstract concepts as we would have thought. From the protocols in this study it was obvious that the older children were struggling to give more precise definitions; and under different circumstance, they might have been able to do so. Nevertheless, it is somewhat surprising to find that in spite of their ability to focus on form, definitions to such important abstract concepts were either too broad or too narrow even at the age of 18. Even the nouns "freedom" and "justice", the two concepts most likely to be formally taught in school, were defined either too broadly or too narrowly. It may be that children and adolescents can use these concepts correctly in context; however they don't seem to have a clear understanding that "the definiens should not denote more things than are denoted by the definiendum, nor fewer things either" (Copi, 1972, p. 138). That is to say, they rarely give criterion responses. Being able to engage in the process of defining concepts is an important skill. It is the basis of inquiry and the products of this process, i.e., working definitions, impinge upon every aspect of our existence (Millocks, 1984). For example, the controvery over abortion is essentially a problem of definition. "What is life?" "When does life begin?" "How far does the protection of the Fourteenth Admendment

extend?" The controversies about euthanasia, terrorism, and pornography are also problems of definitions. Since complex definitions underlie our legal system, scientific and medical practice, and religious and ethical thinking (Hillocks, 1984), it may be an important task for educators to help students become better analytic thinkers by teaching them to be even more conscious of the process of defining and of the form that their definitions take.

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Footnotes

[1]For the sake of brevity, I have not included the detailed rules I used to categorize definitional responses. These rules may be obtained by contacting the author.

[2]The most frequently negated responses are largely those types of responses which are frequently given to concrete nouns or to abstract nouns without negation. Conversely, the least frequently negated responses are largely those types of responses which are infrequently given to concrete nouns or to abstract nouns without negation.

Table 1

DEFINITIONAL RESPONSES

A. Analytic

1. Class
   a. Explicit Class
   b. Implicit Class

2. Characteristic
   a. Function
   b. Action
   c. Part
   d. Composition
   e. Feature
   f. Time/Space
   g. Origin
   h. Ideation

3. Criterion

4. True Negation

B. Non-Analytic

1. Coordinate
   a. True Synonye
   b. Similar

2. Extension
   a. Specific Event
   b. Type

3. Negation
   a. True Negation
   b. Antonye

C. Miscellaneous

1. Structural Statements
2. Simple Repetitions
3. Undeciperable Comments
4. Task Comments
5. Off-Target Comments and Errors
6. Restatements

Table 2

PER CENT OF DEFINITIONAL RESPONSES BY TYPE OF WORD AND AGE*

Definitional Response	Concrete				Abstract			
	10 yrs	14 yrs	18 yrs	Mean %	10 yrs	14 yrs	18 yrs	Mean %
Class	24.7	22.0	20.0	22.1	8.8	10.5	16.5	12.8
Charac.	68.7	70.8	72.1	70.6	40.1	46.8	53.2	48.2
Criterion	0.2	0.0	0.7	0.3	2.7	3.9	5.6	4.4
Coordinate	2.9	3.6	2.9	3.1	15.4	13.9	6.5	11.0
Extension	1.0	1.8	1.6	1.5	9.3	9.5	4.7	7.3
Negation	2.5	1.8	2.7	2.4	23.7	15.4	13.5	16.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total No. Def Resp	1185	1296	1478		486	769	999	

*There were 120 subjects in all; 40 subjects at each age level. Each subject defined 8 concrete words and 8 abstract words for a total of 1920 definitions. A definition could contain more than one kind of definitional response.

Table 3

PER CENT OF DEFINITIONAL RESPONSES FOR CONCRETE NOUNS BY AGE*

Definitional Response	10 years	14 years	18 years
Class			
Explicit	9.3	14.4	16.6
Implicit	15.4	7.6	3.4
Characteristic			
Function	17.1	16.0	14.1
Action	5.7	5.5	4.0
Part	13.6	15.3	20.6
Composition	2.5	2.5	2.2
Feature	16.4	18.6	17.9
Time/Space	9.1	7.0	7.5
Origin	1.3	1.3	1.3
Ideational	3.0	4.6	4.5
Criterion	0.2	0.0	0.7
Coordinate			
True Synonym	1.5	2.3	1.8
Similar	1.4	1.3	1.1
Extension			
Specific Event	0.0	0.0	0.0
Type	1.0	1.8	1.6
Negation			
True Negation	2.5	1.8	2.7
Antonym	0.0	0.0	0.0
Total %	100.0	100.0	100.0
Total No. Def. Resp.	1185	1296	1478

*There were 120 subjects in all; 40 subjects at each age level. Each subject defined 8 concrete words for a total of 960 definitions. A definition could contain more than one kind of definitional response.

Table 4

PER CENT OF DEFINITIONAL RESPPONSES FOR ABSTRACT NOUNS BY AGE*

Definitional Response	10 years	14 years	18 years
Class			
Explicit	1.8	4.7	9.7
Implicit	7.0	5.8	6.8
Characteristic			
Function	1.4	0.4	2.5
Action	0.0	0.0	0.0
Feature	0.0	0.0	0.5
Time/Space	1.4	1.9	2.2
Origin	0.2	0.3	1.8
Ideational	37.1	44.2	46.2
Criterion	2.7	3.9	5.6
Coordinate			
True Synonym	15.2	13.5	5.5
Similar	0.2	0.4	1.0
Extension			
Specific Event	7.0	4.8	2.4
Type	2.3	4.7	2.3
Negation			
True Negation	17.1	11.6	11.0
Antonym	6.6	3.8	2.5
Total %	100.0	100.0	100.0
Total No. Def. Resp.	486	769	999

*There are 120 subjects in all; 40 subjects are each age level. Each subject defined 8 abstract words for a total of 960 definitions. A definition could contain more than one kind of definitional response.

Table 5

PER CENT OF ANALYTIC AND NON-ANALYTIC RESPONSES BY TYPE OF WORD AND AGE*

Definitional Response	Concrete			Abstract		
	10 yrs	14 yrs	18 yrs	10 yrs	14 yrs	18 yrs
Analytic	95.5	94.2	95.0	66.1	71.8	85.6
Non-Analytic	4.5	5.8	5.0	34.0	29.2	14.4
Total %	100.0	100.0	100.0	100.0	100.0	100.0
Total No. Def. Resp.	1185	1296	1478	486	769	999

*There were 120 subjects in all; 40 subjects at each age level. Each subject defined 8 concrete words and 8 abstract words for a total of 1920 definitions. A definition could contain more than one kind of definitional response.

Table 6

PATTERNS OF RESPONDING AND THE NUMBER AND PER CENT OF DEFINITIONS CONTAINING THEM BY CONCRETE AND ABSTRACT NOUNS BY AGE[a]

	Concrete			Abstract		
Age	Patterns of Responding	%	No.	Patterns of Responding	%	No.
10 years	Class + Characteristic	74	235	Characteristic	20	48
	Characteristic	7	22	Coordinate	14	32
	Class, Characteristic + Negation	5	16	Negation	13	31
	All Other Responses Combined[b]	14	45	Characteristic + Negation	11	26
	Total	100	318	Class + Characteristic	8	20
				All Other Responses Combined[b]	34	80
				Total	100	237
14 years	Class + Characteristic	67	212	Characteristic	22	67
	Characteristic	11	35	Class + Characteristic	12	35
	All Other Responses Combined[b]	22	70	Coordinate	11	33
	Total	100	317	Characteristic + Negation	9	27
				Characteristic + Coordinate	7	21
				All Other Responses Combined[b]	39	117
				Total	100	300
18 years	Class + Characteristic	65	206	Class + Characteristic	23	72
	Characteristic	11	36	Characteristic	19	60
	Class + Characteristic + Negation	5	17	Characteristic + Negation	9	29
	All Other Responses Combined[b]	19	59	Class + Characteristic + Negation	8	26
	Total	100	318	Coordinate	5	16
				All Other Responses Combined[b]	36	106
				Total	100	309

[a]There were 40 subjects at each age level. Each subject defined 8 concrete and 8 abstract nouns. At each age level there were a total of 640 definitions, 320 for concrete nouns and 320 for abstract nouns. Miscellaneous definitions were excluded in the calculations.

[b]None of these responses alone totaled 5% of the total number of definitions.

Table 7

PER CENT OF NEGATED ANALYTIC AND NEGATED NON-ANALYTIC RESPONSES BY TYPE OF WORD AND AGE*

Definitional Response	Concrete			Abstract		
	10 yrs	14 yrs	18 yrs	10 yrs	14 yrs	18 yrs
Negated Analytic True Negations	76.7	79.2	80.0	60.9	68.6	76.3
Negated Non-Analytic						
True Negations	23.3	20.8	20.0	10.4	6.8	5.2
Antonym	0.0	0.0	0.0	27.8	24.6	18.5
Total %	100.0	100.0	100.0	100.0	100.0	100.0
Total No. Neg. Resp.	30	24	40	115	118	135

*There were 120 subjects in all; 40 subjects at each age level. Each subject defined 8 concrete words and 8 abstract words for a total of 1920 definitions. Not every definition contained a negation response.

TABLE 8

PER CENT OF ANALYTIC AND NON-ANALYTIC ERRORS BY TYPE OF WORD AND AGE*

	Concrete			Abstract		
Errors	10 yrs	14 yrs	18 yrs	10 yrs	14 yrs	18 yrs
Analytic	81.8	66.7	79.0	42.3	53.3	66.7
Non-Analytic	18.2	33.3	21.0	57.7	46.7	33.3
Total %	100.0	100.0	100.0	100.0	100.0	100.0
Total No. of Errors	11	21	19	26	45	18

*There were 120 subjects in all; 40 subjects at each age level. Each subject defined 8 concrete words and 8 abstract words for a total of 1920 definitions. A definition could contain one error, more than one, or none at all.